

REMARKS

Claim Status

Claims 13-44 are pending. Claims 13, 27-29, 43, and 44 are the independent claims. Claims 29-44 are new and correspond to previously pending 13-28, respectively, with the element scandium (Sc) being removed from the group of elements for component A in each of the independent claims.

Section 112, Paragraph 1 Rejection

The Office action alleges that “[a]mended independent claims 13, 27, and 28 recite the limitation of a luminescent material structure comprising Sc (scandium); however, the specification only provides support for Se (selenium).” We disagree.

1. The Explicit Description In The PCT Abstract Is Sufficient

The present application is a Section 371 National Stage application of PCT/DE00/02405. (See attached filing receipt). We also respectfully remind the Examiner that: 1) “An international application designating the United States shall have the effect, from its international filing date under article 11 of the treaty, of a national application for patent regularly filed in the Patent and Trademark Office” (35 U.S.C. §363); and 2) “[T]he abstract of the disclosure has been interpreted to be a part of the specification for the purpose of compliance with paragraph 1 of 35 U.S.C. 112” (MPEP §608.01(b)). Accordingly, we can rely on the Abstract of PCT/DE00/02405 for written description support to comply with Section 112, paragraph 1.

Here, “[t]he Examiner concedes that the Abstract of Application PCT/DE00/02405, clearly discloses Sc as part of the luminescent material.” (Office Action at page 4). Because the law clearly states that we can rely on this Abstract for written description support, and because the Abstract clearly discloses Sc (scandium) as part of the luminescent material, there can be no reasonable dispute that Applicants are entitled to amend independent claims 13, 27, and 28 to recite the limitation of a luminescent material structure comprising Sc (scandium) (as a member of a Markush group). “Amendments to an application which are supported in the original

description are NOT new matter.” (MPEP §2163.07). Accordingly, we ask the Examiner to withdraw the rejection.

The Office Action contends that because the foreign priority document and other portions of the PCT application list Se (selenium) instead of Sc (scandium), one can conclude that the inclusion of Sc (scandium) in the Abstract was a typographical error. (Office Action at page 4). We respectfully disagree, and ask the Examiner to provide legal authority as to why he can ignore the explicit written description of Sc (scandium) in the present application as support for applicants’ claims. In short, we submit that the disclosure in the Abstract alone is sufficient to meet the written description requirement, whether or not the inclusion Se (selenium) in other portions of the PCT application was intentional.

2. One Of Ordinary Skill In The Art Would Realize That Sc Was Intended

Nonetheless, although we believe the support in the PCT Abstract is sufficient to overcome the Section 112 rejection, we reiterate again that the inclusion of Se (selenium) in the other portions of the PCT application and in the foreign priority document was not intentional, and that one of ordinary skill in the art would understand that this was a typographical error and that Sc (scandium) was intended. Our reasons follow:

2.1. Electronic configuration

A person of ordinary skill in the art would appreciate that that the intended element cannot be selenium, because selenium cannot be “A” of garnet structure $A_3B_5O_{12}$ due to its electronic configuration. Specifically, in the claimed structure $A_3B_5O_{12}$, oxygen has a 2^- oxidation state, leading to a formal charge of 24^- ($12 \times 2^-$) for the oxygen atoms combined. “B” is Al, Ga or In. Each “B” element in such structures generally has a 3^+ oxidation state, for a formal charge of 15^+ ($5 \times 3^+$). This means that any “A” element of the garnet structure needs have a positive oxidation state to balance the 24^- formal charge of oxygen and the 15^+ formal charge of the “B” element (9^+ needed to balance). In contrast, selenium is known to be highly electronegative, typically having a 2^- oxidation state like oxygen (for example, selenium is in the same column as oxygen in the periodic table). Therefore, Se cannot be the intended element, which would be easily recognized by one of ordinary skill in the art.

2.2 Selenium is not a rare-earth metal

A person of ordinary skill in the art would appreciate that that the intended element in the specification cannot be selenium, because selenium is not a rare-earth metal. For example, the original specification states:

“Such luminescent materials preferably have cerium-doped garnet structure $A_3B_5O_{12}$, in which the first component A contains at least one element from the group consisting of Y, Lu, Se, La, Gd, Sm and Tb and the second component B represents at least one of the elements aluminum, gallium, and indium.” (Page 2, lines 19-23).

“It is possible to use terbium [Tb] as the principle constituent of the first component A of the garnet, alone or in combination with at least *one of the other rare-earth metals proposed herein above*.” (Page 3, lines 4-6, emphasis added).

The second sentence cited above clearly indicates that the first component A relates to a rare-earth metal and refers to the list of such rare-earth metals in the first sentence cited above. However, the list in the first sentence includes Se (selenium), which is not a rare earth element. For example, *Encyclopedia Britannica, Volume 9, 1998* defines a rare-earth metal as “any of a large family of chemical elements consisting of scandium (atomic number 21), yttrium (39), and the 15 elements from lanthanum to lutetium.” A copy of the definition is attached herewith.

Accordingly, a person of ordinary skill in the art would appreciate that that the intended element in the specification cannot be selenium, because selenium is not a rare-earth metal.

2.3 Scandium (Sc) is the only rare-earth metal whose symbol is close to Se

Because of the similarity in the symbols for selenium and scandium, specifically, Se and Sc, respectively, and because scandium is a rare earth metal as defined above, a person of ordinary skill in the art would appreciate that Sc was the intended element. The only other similar rare earth metals whose symbols are similar to Se are samarium (Sm) and cerium (Ce). However, Sm is already included in the list of suitable elements for component A, and Ce is already disclosed as an activator for the disclosed garnet structure. Moreover, the explicit disclosure in the PCT Abstract reiterates that the intended element was scandium (Sc).

2.4 Response to the Examiner's positions

The Examiner notes that he “could not find in the disclosure where it is stated that the component ‘A’ of the garnet structure is a rare earth element.” (Office action at page 4). As described in at least the cited sentences presented above in section 2.2, however, the specification does indeed disclose the component ‘A’ of the garnet structure is a rare earth element.

The Examiner also notes that ‘Sc’ is a transition metal, and that “[f]ollowing Applicants’ position, ‘Se’ may refer to ‘Fe’, ‘Re’, or ‘Sg.’” (Office action at page 4.) Regardless of whether Sc may also be considered a transition metal, the definition from *Encyclopedia Britannica* provided above in section 2.2, clearly includes Sc as a rare earth metal. Moreover, because the component ‘A’ of the garnet structure is a rare earth element, the intended element for “Se” must be a rare earth metal, and none of “Fe”, “Re”, or “Sg” is a rare earth metal. Furthermore, the possibility of the intended element being seaborgium (Sg) is simply preposterous because it is radioactive and has a half-life of less than one second. Therefore, the Examiner’s position must fail.

New Matter Rejection of the Specification

The Office action contends that the amendment to various portions of the specification to disclose a phosphor composition that includes scandium (Sc) is new matter and must be deleted. (Office Action at page 2.) We disagree.

As described above in connection with the Section 112 rejection at section 1, even by itself the PCT Abstract provides the explicit written description necessary for the inclusion of Sc in other part of the specification. Specifically, the law clearly states that we can rely on the PCT Abstract for written description support, and the MPEP states “[a]mendments to an application which are supported in the original description are NOT new matter.” (MPEP §2163.07).

Furthermore, a person of ordinary skill in the art would appreciate that Sc should replace Se in the specification for the reasons set forth in connection with the Section 112 rejection at section 2.

Accordingly, we ask the Examiner to withdraw the new matter rejection.

New Claims

New claims 29-44 correspond to previously pending 13-28, respectively, with the element scandium (Sc) being removed from the group of elements for component A in each of the independent claims. Because the only rejection of claims 13-28 concerned the inclusion of scandium (Sc), we submit that new claims 29-44 are allowable.

Conclusion

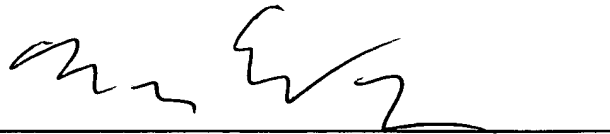
A Notice of Allowance is respectfully requested.

Enclosed is a \$1,400.00 check for excess claim fees and a \$450.00 check for the Petition for Extension of Time fee. Please apply any other charges or credits to deposit account 06-1050, referencing Attorney Docket No. 12406-008001.

Respectfully submitted,

Date: _____

6/13/05



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Luminescent array, wavelength-converting sealing material and light source

Preliminary Class

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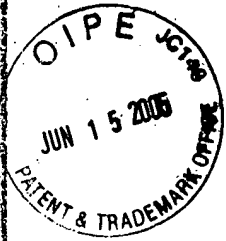
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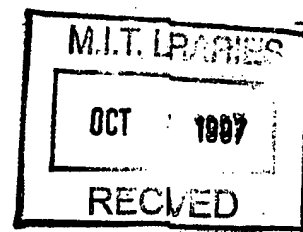
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HUMANITIES



and of law raised in the dispute, and lists the evidence on the issue.

The position originated in the ecclesiastical courts in the European Middle Ages and was adopted by the Parlement of Paris in the late 13th century. Originally *rapporteurs* were not members of the court, but by 1336 they were given full rights to participate in the decision-making process as judges.

The *rapporteur's* functions emerged when investigators were sent by the Parlement to interview witnesses and collect documents. Because so much material was collected, it became necessary to analyze it before it could be presented to the other judges. The *rapporteur* acted alone in making this analysis, but the position rotated among the judges of the court. In later times the *rapporteur* gained a good deal of power. The proceedings under which these deliberations took place were secret, and the decrees gave no reason for the decision; it was only in the 16th century that even the testimony collected by the investigators was released to the parties in the case.

The Revolution brought legislation to do away with these inequities. The *rapporteur* had to present his analysis in open court, and it was later published in law reports. When the Cour de Cassation (now the supreme court of France) was established during the Revolution, the *rapporteur* became a member of the court. He was placed in charge of examining the record of the case, determining issues and means of settlement, and making a recommendation for disposition to the remainder of the court. By the mid-19th century the *rapporteurs* had begun to cite previous decisions in their presentations to the court.

In Germany the *Referent* in the Reichskammergericht, the supreme court of the Holy Roman Empire, had similar responsibilities. He analyzed evidence and legal issues and made his recommendations to the whole court; in important cases two *Referents* were appointed. The reports and discussions were kept secret, and the decisions made no mention of the grounds upon which they were based. By the 17th century, however, the first in a series of law reports on the decisions was published, giving the legal arguments and the *Referents'* conclusions in addition to the votes and opinions of the individual judges.

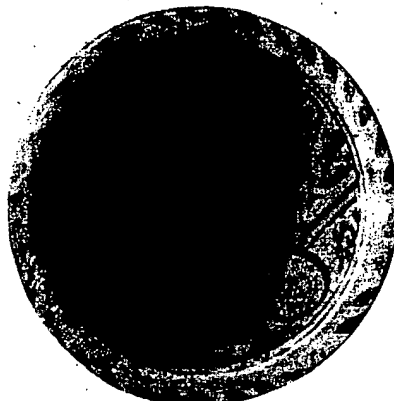
raptor, in general, any bird of prey; the term raptor is sometimes restricted to birds of the order Falconiformes (hawks, eagles, falcons, and their allies). See bird of prey.

raptures of the deep (medicine): see nitrogen narcosis.

Raqqaq, Ar-, also spelled RAQQA, or RAKKA, town, northern Syria, on the Euphrates River just west of its confluence with the Balikh River. Ar-Raqqaq is on the site of an ancient Greek city, Nicephorium, and a later Roman fortress and market town, Callinicus. It flourished again in early Arab times when the 'Abbāsid caliph Hārūn ar-Rashīd built several palatial residences there and made it his headquarters against the Byzantines. For a time the town was called Ar-Rashīd. The Arab astronomer al-Battānī (Albatēni) made his observations there in the 9th and 10th centuries. Mongol invasions in the 13th century destroyed much of the settlement. Gradually the town fell into decay and was replaced in importance by its suburb, Ar-Rafīqah, which took over its name. After the Tabaqah Dam, just up the Euphrates from Ar-Raqqaq, began to be built in 1968, Ar-Raqqaq grew. It became a supply centre for the community at the dam site, where jobs were provided. Local cultivation increased, and Ar-Raqqaq again became an increasingly important market centre. The town has a small museum exhibiting

finds from excavations in the area; a team of archaeologists from the Syrian Department of Antiquities is excavating and restoring buildings of the 'Abbāsid period. Pop. (1985 est.) 118,946.

Raqqaq ware, Islāmic earthenware produced at Ar-Raqqaq, Syria, between the 9th and 14th centuries. The body of the ware, which is white tending to buff, is coated with a siliceous glaze. Designs, sometimes in relief, tend to be



Raqqaq ware bowl, painted in black under turquoise-blue glaze, 13th century; in the Victoria and Albert Museum, London

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bold. Decoration includes brown lustre, and blue and black underglaze paint. Glazes, either opaque or transparent, are usually in shades of blue, bluish green, or turquoise; however, clear glazes, as well as glazes stained purple with manganese, were also used. Perfect excavated specimens are rare.

Rarāmuri (people): see Tarahumara.

rare-earth metal, any of a large family of chemical elements consisting of scandium (atomic number 21), yttrium (atomic number 39), and the 15 elements from lanthanum to lutetium (atomic numbers 57–71). The rare earths themselves are the oxides of these metals, originally thought to be quite scarce, or mixtures of these oxides, commonly occurring together, such as the first rare earths to be discovered, yttria (1794) and ceria (1803).

A brief treatment of the rare-earth metals follows. For full treatment, see MACROPAEDIA: Chemical Elements.

Not all of the rare-earth metals are as scarce as early estimates indicated. Cerium, the most plentiful, is nearly three times more abundant than lead in the Earth's crust. Thulium, the least plentiful (except for artificially produced promethium), is more abundant than silver, gold, or platinum. Moreover, many of the rare-earth metals are found in meteorites, on the Moon, and in the Sun. The spectra of

numerous other stars suggest that they have substantially larger quantities of the rare-earth metals than does the solar system.

The rare-earth elements are never found as free metals in the Earth's crust. Pure minerals of the individual elements do not exist in nature; all their minerals consist of mixtures of various rare-earth elements and nonmetals. Monazite and bastnaesite are the principal mineral sources of the rare-earth metals.

In terms of physical properties, the rare-earth elements do not resemble one another as closely as was once believed. The melting point of lutetium (1,663° C), for example, differs greatly from that of lanthanum (920° C), and the vapour pressures of ytterbium and europium at 1,000° C are millions of times as great as those of lanthanum and cerium. Nevertheless, the rare-earth metals, particularly those with atomic numbers from 58 to 71 (collectively called the lanthanide series), do share certain common characteristics. Cerium, praseodymium, europium, and neodymium all readily corrode in air. Characteristically, small amounts of nonmetallic impurities tend to intensify such properties (e.g., the light lanthanide metals corrode much more rapidly if calcium or magnesium is present).

The rare-earth elements are very similar chemically because of their general similarity in atomic structure. All have three electrons in the outermost shells of their atoms and are therefore trivalent in their compounds. They combine directly with nonmetallic elements, giving rise to extremely stable borides, carbides, oxides, and various other binary compounds.

rarefaction, in the physics of sound, segment of one cycle of a longitudinal wave during its travel or motion, the other segment being compression. If the prong of a tuning fork vibrates in the air, for example, the layer of air adjacent to the prong undergoes compression (or condensation) upon the initial motion of the fork. When the prong springs back in the opposite direction, however, it leaves an area of reduced air pressure. This is rarefaction. A succession of rarefactions and compressions comprise the longitudinal wave motion that emanates from an acoustic source.

Raritan River, largest stream lying wholly within New Jersey, U.S., formed by the confluence of the North Branch and the South Branch in western Somerset county. It flows about 75 miles (120 km) generally southeast past Somerville, Bound Brook, and New Brunswick into Raritan Bay of the Atlantic Ocean. Navigable to New Brunswick, it supplies (via pumping) the Spruce Run (1963) and Round Valley (1965) reservoirs. The name was probably derived from an Algonquian word meaning "stream overflows."

Rarotonga, largest of the lower Cook Islands, in the South Pacific Ocean, 2,100 miles (3,400 km) northeast of New Zealand. Its area is 26 square miles (67 square km). Volcanic in origin, it has a rugged interior rising to Mount Te Manga (2,140 ft [652 m]). Surrounding its mountainous core is a plain, an ancient raised coral fringing reef that has since been covered with sediment. The island is fringed by a coral reef. Visited in 1789 by mutineers from the British ship *Bounty*, Rarotonga bears marks of a long habitation, including *marae*, or temple platforms, in the Tupapa Valley. The Ara Metua, an ancient pathway, circles the island parallel to a modern road. Rarotonga was the base from which Reverend John Williams of the London Missionary Society (who arrived in 1823) sought to Christianize the islands.

Avarua, its main port, is the seat of administration for the Cook Islands. Absence of a suitable lagoon forces oceangoing ships to lie off the reef and move cargoes ashore via lighters. Rarotonga's economy is based on citrus fruits, pineapples, coconuts, bananas, and

Rare-earth elements

	symbol	atomic number
scandium	Sc	21
yttrium	Y	39
lanthanum	La	57
cerium	Ce	58
praseodymium	Pr	59
neodymium	Nd	60
promethium	Pm	61
samarium	Sm	62
europium	Eu	63
gadolinium	Gd	64
terbium	Tb	65
dysprosium	Dy	66
holmium	Ho	67
erbium	Er	68
thulium	Tm	69
ytterbium	Yb	70
lutetium	Lu	71

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